On Time Starts in the Endoscopy Suite

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Abstract

This is an evidence-based project that examined on time starts in an endoscopy suite. The goal of this project was to improve on time starts for all first cases of the day from between 68% - 59%, to 70%. The benchmark of 70% was adopted from on time starts for procedures performed under general anesthesia from the general operating room (OR) because the endoscopy specialty had no industry benchmark. On time start was defined as patient in the procedure room (wheels in) by the scheduled time and out of the procedure room (wheels out) to the Post Anesthesia Care Unit (PACU) on time. The room turnover time between cases was expected to occur within ten (10) minutes and is a team effort for all available staff on the unit. This project utilized the Kaizen/Lean methodology framework. A Rapid Improvement Event (RIE) was originally planned to implement the workflow change with the objectives to hardwire the new process to increase efficiency and to benchmark with other system endoscopy suites. The Rapid Improvement Event was replaced with a pilot project when full cooperation of all stakeholders was not forthcoming.

Keywords: On time start, Kaizen/Lean methodology, Rapid Improvement Event, Pilot, Endoscopy

On Time Starts in the Endoscopy Suite

Background

"Improvements in on time starts will ultimately lead to higher operating room utilization**,** higher profits for the organization, lower overtime costs, and hopefully, improved staff, physician, and patient satisfaction" (Reynolds, 2011, p.261). "All of these combined ultimately lead to higher margins and better marketability" (Reynolds, 2011, p.261). Endoscopy suite delays negatively impact patients and family, and cause undue anxiety and inconvenience with prolonged waiting periods and fear of the unknown. Most operating room delays are due to lack of proper planning or inadequate utilization of available resources (Peter, Parvathaneni, Wilson, Tankalavage and Cheriyath, 2011). Late arrivals by practitioners and inadequate anesthesia preparation of patients constitute a lack of proper planning (Peter et al., 2011).

The endoscopy admission nurses at Sibley Memorial Hospital (SMH) begin their work day at 6:30am, most procedure room nurses arrived at 7am, and the remaining nurses at 8am, to provide coverage for procedures that finish later in the afternoon. According to Cima, et al., "efforts to increase OR productivity need to be counterbalanced against the impact on patients and staff satisfaction and, most importantly, patient and staff and ultimately patient outcomes" (Cima et al 2011, p.83). In this endoscopy unit the first case on time starts ranged between 66% and 68% which did not demonstrate efficiency.

Reynolds (2011) believed that "if the first case of the day is late, there is a rippling effect that continues to multiply as the day progresses, affecting the rest of the scheduled surgery cases for the day" (Reynolds, 2011, p.256). Reynolds (2011) asserted that wasted time indirectly impacts the negative cost of a hospital's bottom line, since operating rooms (procedure rooms) generate 68% of a hospital's budget, and incurs 20% to 40% of its cost. Reynolds's data

findings compared similarly with the expectations of SMH which relies on the operating rooms / procedure rooms as its main source of revenue.

In another study conducted at a German hospital, anesthesiologists Ernst, Szczecin, Soderstrom, Siegmund and Schleppers (2012,) believed that “having an operating room manager, an operating room charter, or both, can have an effect on tardiness of first case starts” (Ernst, Szczecin, Soderstrom, Siegmund and Schleppers, 2012, p. 675). Ernst et al (2012, p. 672) believed that “while the effects of the OR charter as a tool to increase efficiency, are not fully understood, the operating room manager as a tool, is perceived as coordinating operative, logistic and administrative functions to prevent delays”.

Dexter and Macario (2002) believe when that a fixed amount of operating room time called “block time” is awarded to surgeons, surgical specialties or surgical groups, it is based on their historic utilization of the OR time (Dexter & Macario, 2002, p.1272). These authors found that block times were in increments of 4 or 8 hours and those surgeons scheduled any number of cases within the fixed time frames that they believed they will be able to complete based on their historic times (Dexter & Macario, 2002). By working faster, physicians were sometimes able to add additional cases into their block times, or perform fewer cases that take more time (Dexter & Macario, 2002). The disadvantage of having multiple shorter cases was that if there were delays between the earlier cases they may delay the later physicians with starting their cases that could result in later case cancellations (Dexter & Macario, 2002).

To prevent the later scheduled procedures from being delayed, effective communication is necessary between staff members and charge nurses or managers. Dexter, Abouleish, Epstein, Whitten and Lubarsky (2003) analyzed turnover time in one academic anesthesia department to determine its effect on caseloads and staffing cost. Dexter et al., (2003) found that “reducing

turnover time would seem to benefit physicians and hospitals rather than revenue or operating room patients" (Dexter et al., 2003, p.1119). Similarly, at SMH, turnover does not impact the cases to follow nor does it delay the next case scheduled in that room when all available staff is engaged in room turnover between cases, and when management facilitates the workflow.

According to Peter et al. (2011, p.1), "the two main factors that cause delays in surgery are late surgeon arrival and patient flow in the pre-operative preparation unit (Pre-op)". "Delayed start for the first case of the day will have a ripple effect as the following cases get delays which result in low patient annoyance and disruption in the operating room and staff schedules", (Peter et al, 2011, p.1). Peter et al., (2011) stated "the National Advisory Committee has set the bench mark at 59% for first cases to be wheeled into operating /procedural rooms on time, when there is not a 5 minutes grace period; and at 70% on time starts for hospitals with a grace period" (Peter et al., 2011, p.1). This endoscopy unit had a five minute grace period and the average first case on time start was at 68%. The SMH endoscopy team was committed to reaching or exceeding the national standard goal of 70% by April 2015.

Project Question

Will adding five minutes for the general anesthesia pre-assessment to the procedure time for first cases: 1) reduce delays; 2) reduce the ripple effect of delays to subsequent procedures; 3) improve overall efficiency; 4) increase satisfaction scores for patients, physicians and staff; 5) decrease overtime; and 6) increase financial performance for the hospital.

Problem Identification and Significance

Problem Identification for case delays

The identified challenges with first case delays in the endoscopy unit at SMH as perceived by staff were confirmed by the staff questionnaire and were multifaceted: 1)

physicians not arriving on time; 2) patients not arriving on time; and 3) no dedicated time for anesthesia pre-assessment in cases receiving general anesthesia. In this unit a change of practice occurred where general anesthesia administered by an anesthesiologist became the preferred method of sedation for endoscopy procedures, instead of moderate sedation administered by a nurse. Based on the review of collected data at SMH, the endoscopy physicians do not arrive early enough before the scheduled procedure to have enough time to review and update patient medical record, to obtain patient consent, to answer patient questions and to verify the procedure.

The anesthesiologist performs a required pre-procedure assessment prior to the administration of anesthesia. The pre-procedure assessment is performed immediately prior to the procedures in the Pre-op area or in the procedure room. If a patient is not cleared to receive general anesthesia for medical reasons, the anesthetic technique will be changed to moderate sedation or the procedure will be cancelled based on the recommendation of the anesthesiologist.

"When the operating room staff at New York University Langone Medical Center searched for a benchmark for on-time starts in 2009, there were none, so an on time start committee was developed and they set their own goal" (Fezza & Palermo, 2011, p. 451). Since 2011, many hospitals including SMH have set their own goal for on time start as "wheels in the room within five minutes of the scheduled procedure time". The endoscopy unit at SMH set the goal to improve on time starts for all first cases of the day from between 68% - 59%, to 70%.

Significance

Since operating rooms/procedural areas consume the largest proportion of hospitals' budgets, and are the biggest contributors of revenue (Cima et al, 2010), it is imperative that the endoscopy unit functions efficiently, has high productivity, and has goals that align with the organizations. Components of procedural throughput that can promote or prevent on-time starts

include the following: 1) accurately scheduling cases; 2) completion and review of pre-operative and diagnostic tests; 3) anesthesia pre-assessment; 4) communication with primary care physicians and referring physicians offices; 5) timely patient arrivals; 6) technology; 7) instrumentation; and staffing (Cima et al, 2010). SMH currently incurs overtime to finish procedures that extend later than the endoscopy unit hours, which also includes the utilization of on-call staff.

Efficient and timely procedure room turn over allows “the case to follow” to start as posted in the procedure room. According to O’Connor (2013), some operating rooms have dedicated turnover teams while others utilize the staff already in the room to perform the turnover and set up for the next case. At the SMH endoscopy unit, when multiple procedure rooms end at the same time, each staff turns over their own room immediately following completion of the case. Communication and coordination between the staff in the procedure room and the charge nurse helps with this process. O’Connor (2013) recommends that operating rooms have a game plan that everyone one is aware of to allocate resources. O’Connor (2013) identifies that prolonged turnover times add hours to the day and subtracts dollars from the bottom line over the year. The endoscopy team at SMH approach room turnover as team effort and use any necessary resources to complete the job.

Purpose

The purpose of this project was to improve on time starts for all first cases of the day from between 68% - 59%, to 70%. The endoscopy team recognized that there were opportunities for improving patients, physicians’ and staff satisfaction by starting all procedures on time. The endoscopy team had a robust plan to achieve their goal with buy-in from their anesthesiologists and endoscopy physicians.

Room turnover in the endoscopy unit was extremely efficient based on previously collected data. Room turnover was a team effort and occurred within an average of 10 minutes between procedures. Room turnover occurs during “the time from one patient exits an operating room, until the next patient on that day’s operating room schedule enters the same operating room”, (McIntosh, Dexter, Epstein, 2006, p.1502).

This project included a retrospective data review of the last three months on time starts in 2014 for first case in the room and successive case delays. The scheduling times and the total number of cases performed were also examined. The endoscopy staff and physicians were educated on the new improvement plan. The physicians and their office staff were asked to add five minutes when scheduling procedures to allow for the change from moderate sedation to general anesthesia, which required an additional pre-assessment by an anesthesiologist prior to the start of the case. This request was initially rejected by the endoscopy physicians because of the concern that the additional time would reflect negatively on their total procedure time. The anesthesiologists were confident they could complete the pre-assessment in the additional five minutes allotted time. Another process change, the endoscopy physicians were asked to have their patients’ history and physical (H & P) available 72 hours in advance of the procedure for review by the anesthesiologist. This request was also rejected by the endoscopy physicians so instead the responsibility of reviewing the H & P was given to a nurse practitioner in the preoperative area immediately prior to the procedure.

This project utilized the Kaizen/Lean methodology framework. A Rapid Improvement Event (RIE) was originally planned to implement the workflow change with the objectives to hardwire the new process to increase efficiency and to benchmark with other system endoscopy

suites. The Rapid Improvement Event was replaced with a pilot project when full cooperation of all stakeholders was not forthcoming.

Project Framework

SMH's endoscopy team chose Kaizen theoretical framework for this process improvement initiative (See Appendix B). According to Tetteh (2012), Kaizen framework is a process improvement theory that was first used by the steel industry in the 20th century to increase productivity, safety, efficiency, profitability, and to decrease its workforce. "The five-step Kaizen framework is based on teamwork, personal discipline, improved morale, quality, and suggestions for improvement" (Tetteh, 2012, p.105). The steps in the Kaizen process mirror the principles of this process improvement team's goals for the unit to work efficiently and to reduce waste and non-value added steps for patients care.

The Protection of Human Participants

This project received a Letter of Determination from the Drexel University Institutional Review Board (IRB) (See Appendix A). SBM did not require any IRB review or approval of performance improvement projects.

Methods / Implementation

Kaizen/Lean methodology has been adopted by SMH as the method to formalize, monitor and improve efficiency throughout the hospital. Lean methodology is a process used by organizations (including Toyota industry) to limit resources to those that add value to the end customer (Kimsey, 2010). "Lean is a process that continually reduces waste and improves workflow to efficiently produce a service that is perceived to be of high value to those who use it", (Cima et al, 2010, p.84). "A3 thinking" according to (Kimsey, 2010), is a logical and standard communication tool or roadmap for a project that shows where project workers where

they are and where they are going. An original A3 lay out is an 11" by 17" paper with a concise visual map with eight steps, beginning with the reason for action and ending with the new confirmed state (Kimsey, 2010). An A3 includes an initial RIE that occurs over a few days to a week, and involves the PI department, key stakeholders, impacted staff, and an independent participant as "fresh eyes", all aimed at contributing to the success of the process improvement initiative (Kimsey, 2010). (See Appendix C and J).

Activities and Analytical Tools included:

- An eight (8) item questionnaire completed by physicians and staff for feedback on their perceived reasons for case delays. (See Appendix D and E)
- Review of three months data from Fall 2014 related to first cast on time starts. (See Appendix F and G).
- Daily manual tracking of arrival time of patients to registration by volunteers, electronic documentation times to Pre-Op, and time into the procedure room
- Documentation of physician and staff arrival times in the EPIC Electronic Medical Record (EMR)
- Review of EPIC electronic medical record for start and end time stamps of procedures
- Review of patient satisfaction scores and responses from 24 hours post-procedure phone calls to patients
- Department Manager's review of staff quarterly satisfaction survey results
- Data from two day pilot of one physician (Dr. X) cases using new proposed process. (See Appendix H, I, K, and L)
- Documentation of findings and recommendations of 2 day pilot project

- Presentation of findings to SMH's endoscopy leadership team for full implementation in the future

A Rapid Improvement Event (RIE) was originally planned to implement the workflow change with the objectives to hardwire the new process to increase efficiency and to benchmark with other system endoscopy suites. The Rapid Improvement Event was replaced with a pilot project when full cooperation of all stakeholders was not forthcoming.

One physician agreed to participate on the pilot project. The two day pilot project was implemented and consisted of a small population of eight endoscopy patients of Dr. X in the endoscopy suite. One case on day two was performed in the main operating room and was not included in the data. After all patients of Dr. X were registered and changed into procedure gowns, they were taken directly to Pre-op on a stretcher. The patients were then assessed in pre-op or the procedure room by the anesthesiologist.

All patients during the pilot were registered, prepped and transferred into the procedure room on time. During day one of the pilot all cases started and ended on time. On day two of the pilot the first three cases started and ended on time and the last three cases of the day were delayed due to a travel delay on case four.

Evaluation

The pilot performance improvement project demonstrated success with an improvement of first case on time starts. Having the same anesthesiologists for both days of the project helped to maintain the efficiency of the room along with the endoscopy team support. The pilot was successful on day one with 100% of all patients wheeled into the procedure room before the posted start time and 80% of all endoscopy procedures started before the scheduled time. The start time delays on day one of the pilot were due to a variety of factors including the following:

1) change in anesthesia assigned staff; 2) staffing changes due to call outs and mandatory education requirements; and 3) H & Ps not completed 72 hours in advance.

All cases on day two had procedure start times (scope in) 5 - 15 minutes after the scheduled time. The delays on day two of the pilot performance improvement project were due to: 1) physician delay; 2) H & Ps not completed 72 hours in advance; and 3) patients were admitted to the nurse Prep room on chairs before they were transferred to stretchers in Pre-op or the procedure room.

Outcomes

During the pilot performance improvement project, there was an improvement in the total number of first case on time starts on day one of the pilot. The first scheduled patient at 08:00am cancelled which resulted in the 08:30am patient being admitted in Pre-op earlier and the procedure started on time. The flow of the procedures was very timely because the endoscopy physician was the same for all of the patients in the pilot. On each day there was also the same anesthesiologist, except for the last case day one which had a “case start” time later than “posted time”.

The following practices contributed to the improvement of first case on time starts: 1) admission of patients directly on a stretcher in Pre-op; 2) Nurse Practitioner review of H & Ps prior to patient admission; 3) addition of 5 minutes to total procedure time for cases receiving general anesthesia; and 4) cases that had to travel to the operating room were scheduled at the beginning or at the end of the schedule to avoid potentially delaying all cases that followed.

Strengths and Limitations of Pilot Project

Strengths

There was eagerness by the staff and the medical director of the endoscopy unit to

complete this pilot performance improvement project. There was engagement in all phases of the patient flow process to identify any gaps to fix the process. The medical director of the unit showed transparency as a role model by allowing his practice and procedures to be used as the example for pilot. The staff that facilitated the modification of the Pre-op flow showed flexibility by allowing patients to by-pass the nurse prep room to be accommodated earlier in their space for the project.

Limitations

This pilot performance improvement project was limited to a two day pilot using one endoscopy physician's patients in one hospital. Only a total of fourteen patients participated in the pilot project although approximately sixty procedures were done in the unit on those two days. One patient by-passed the Pre-op area on the second day and was transferred from the Prep room to the procedure room to avoid a delay that would have resulted from waiting for a stretcher in Pre-op. The inconsistent practice did not allow the pilot to measure the extent of delay that could have resulted if the patient followed the process of all other patients in the pilot. The impact that the pilot could have on less experienced physicians was not measured against that of the most experienced doctor on the unit.

Summary

SMH's endoscopy team has administrative support and the necessary resources to replicate the pilot for all patients with the goal to achieve 70% first case on time starts. Additional communication is needed between administration, anesthesia physicians and endoscopy physicians to get buy-in and agreement on the new process, which includes adding an additional five minutes to total case times for patients who are scheduled to receive general

anesthesia during the endoscopy procedures. Once total agreement and buy-in is achieved from all the stakeholders the revised process is destined for success.

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Appendix A - Drexel University IRB Letter of Determination

Drexel UNIVERSITY
Office of Research

APPROVAL OF PROTOCOL

February 18, 2015

Linda Wilson
Drexel University
College of Nursing and Health Professionals
1505 Race Street – Room 235
MS 501
Philadelphia, Pa 19102

Dear Dr. Wilson,

On February 18, 2015 the IRB reviewed the following protocol:

Type of Review:	Initial
Title:	On Time Starts for all Procedures in the Endoscopy Suite at Sibley Memorial Hospital
Investigator:	Linda Wilson, RN, PhD
IRB ID:	1502003419
Funding:	Internal
Grant Title:	None
Grant ID:	None
IND, IDE or HDE:	None
Documents Reviewed:	Request for Letter of Determination of Non-Human Subject Research

The IRB determined after reference to HRP 310 and the OHRP FAQ guidance regarding Quality Improvement projects that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human in which the organization is engaged, please submit a new request to the IRB for a determination.

Sincerely,

John C. Medendorp

Appendix B – Kaizen Process

TABLE 1. Example of Process Improvement in Perioperative Nursing. AORN Journal (2012), Vol.95, No.1, 106.

Kaizen Principles	Perioperative nursing process improvement examples
Teamwork	Surgical checklists, on-time OR starts
Personal discipline	Continued nursing education, improving personal skills and knowledge
Improved morale	Enthusiasm for challenges and opportunities in health care
Improved morale	Focused knowledge transfer by staff for improved patient health care quality and safety
Suggestions for Improvement	Perioperative process improvement measurement on behalf of patients

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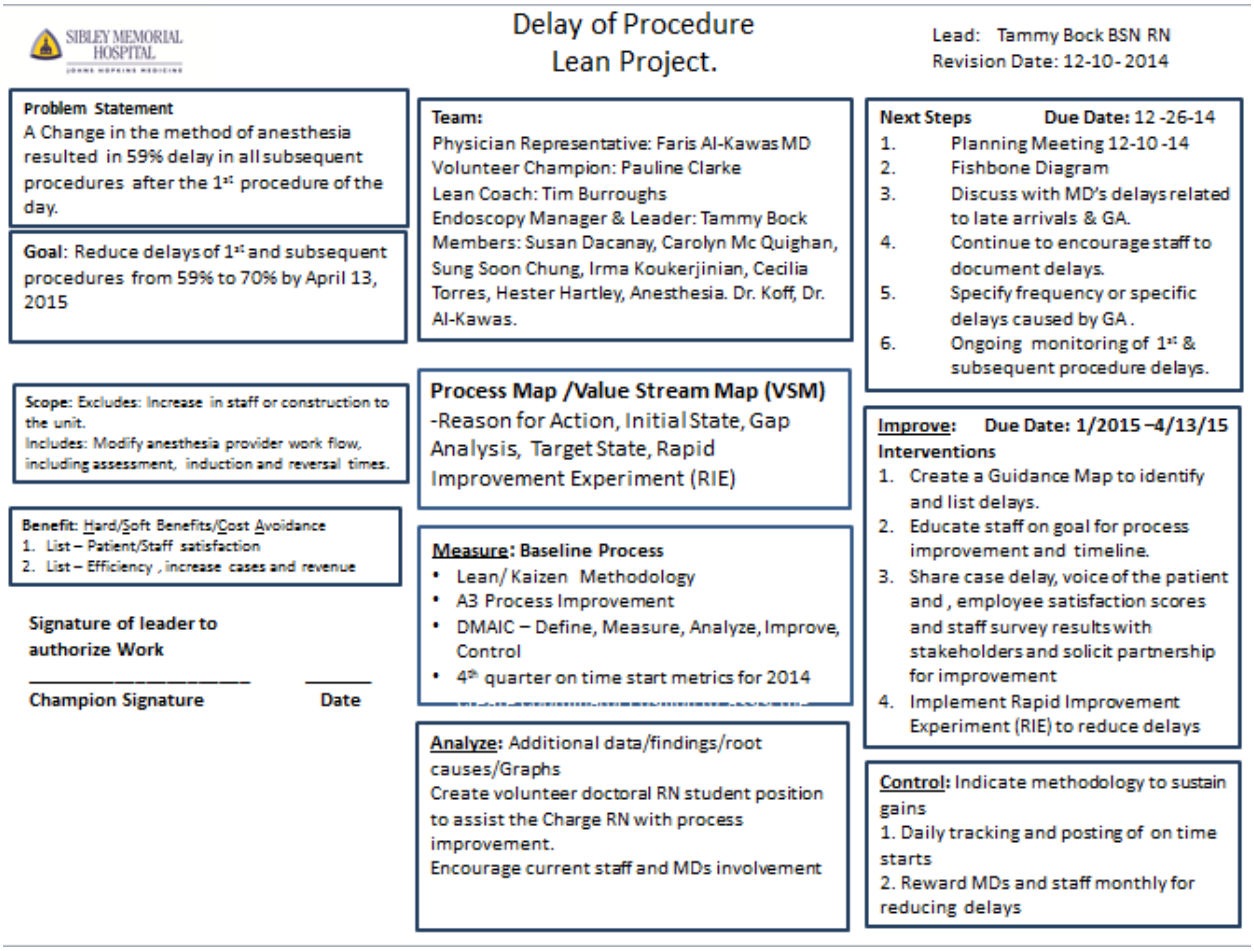
Appendix C – A3 chart of Kaizen Project



Appendix D - Questionnaire

Endoscopy Staff Questionnaire re: Cause of Procedure Delays

Please indicate below by circling**: Yes (Y), No (N), Not Sure (N/S),** or provide comment:

1. What are the 2 primary reasons that you think cause case delays?
   1. _____
   11. _____

2. Are case delays due to the change in the method of anesthesia from moderate sedation to general anesthesia (GA).
   Y N N/S Comment: _____

3. Does the time taken for patients to wake up from Propofol after general anesthesia (GA) as opposed to Fentanyl after moderate sedation contributes to next procedure delay?
   Y N N/S Comment: _____

4. Case delays can be decreased if time is added between cases for pre-anesthesia patient assessment.
   Y N N/S Comment: _____

5. Do you believe that having one designated anesthesiologist assess patients pre-operatively between procedures will decrease case delays?
   Y N N/S Comment: _____

6. Can GI physicians help to decrease procedure delays? How?
   Y N N/S Comment: _____

7. If GI doctors saw the next patient before dictating the previous procedure, do you think it would save time and reduce next case delays?
   Y N N/S Comment: _____

8. Do you believe that the presence and the teaching of Medical Residents during procedures contribute to case delays?
   Y N N/S Comment: _____

Appendix E – Survey Results

Top 2 Survey Reasons for Delays

1. Endoscopy physician workflow

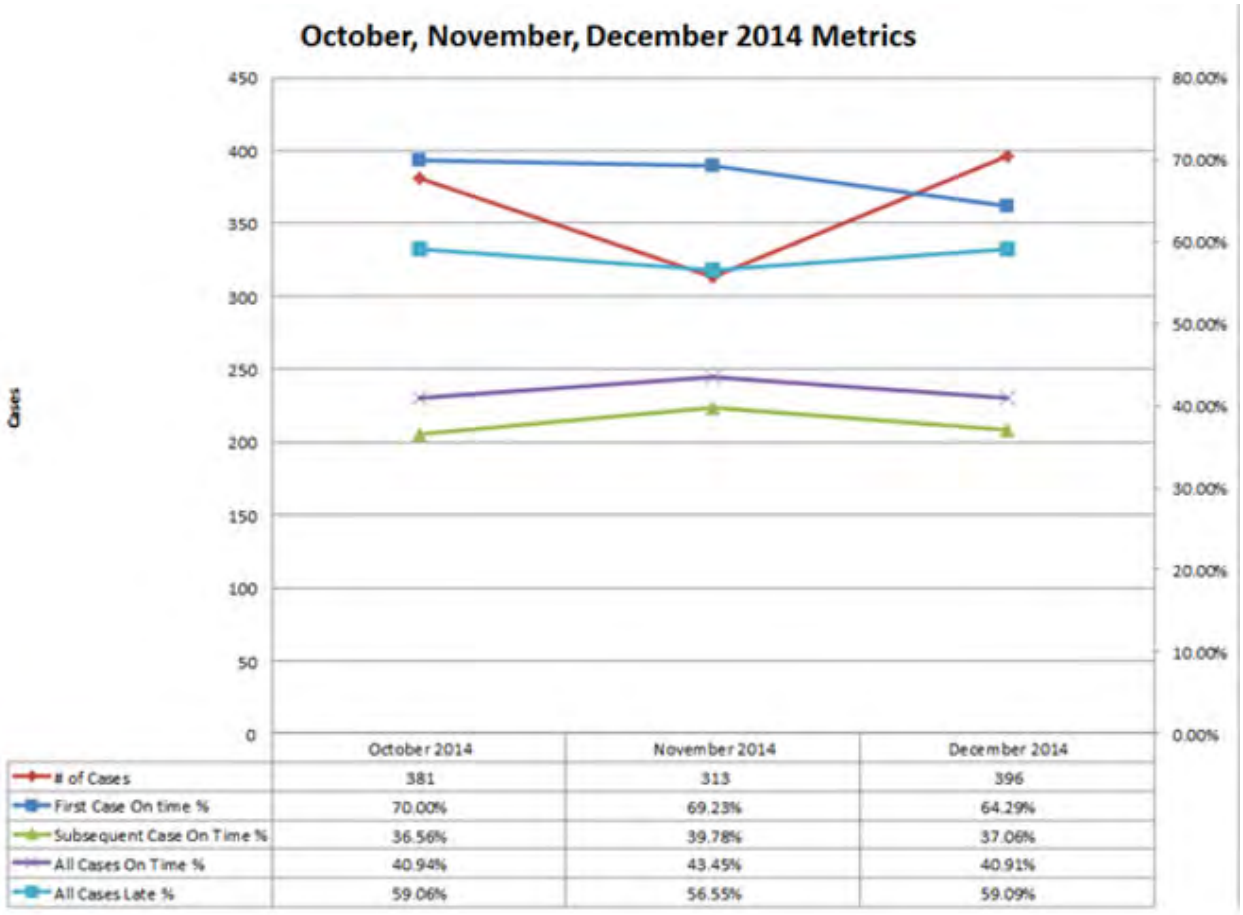
2. Anesthesia physician workflow

Appendix F - 3 Months Retrospective Data First Case Starts

Sibley

SMH Endoscopy Outpatient Surgery	# of Cases	First Case On time %	Subsequent Case On Time %	All Cases On Time %	All Cases Late %
October 2014	381	70.00%	36.56%	40.94%	59.06%
November 2014	313	69.23%	39.78%	43.45%	56.55%
December 2014	396	64.29%	37.06%	40.91%	59.09%

Appendix G – Fall 2014 On Time Start Data

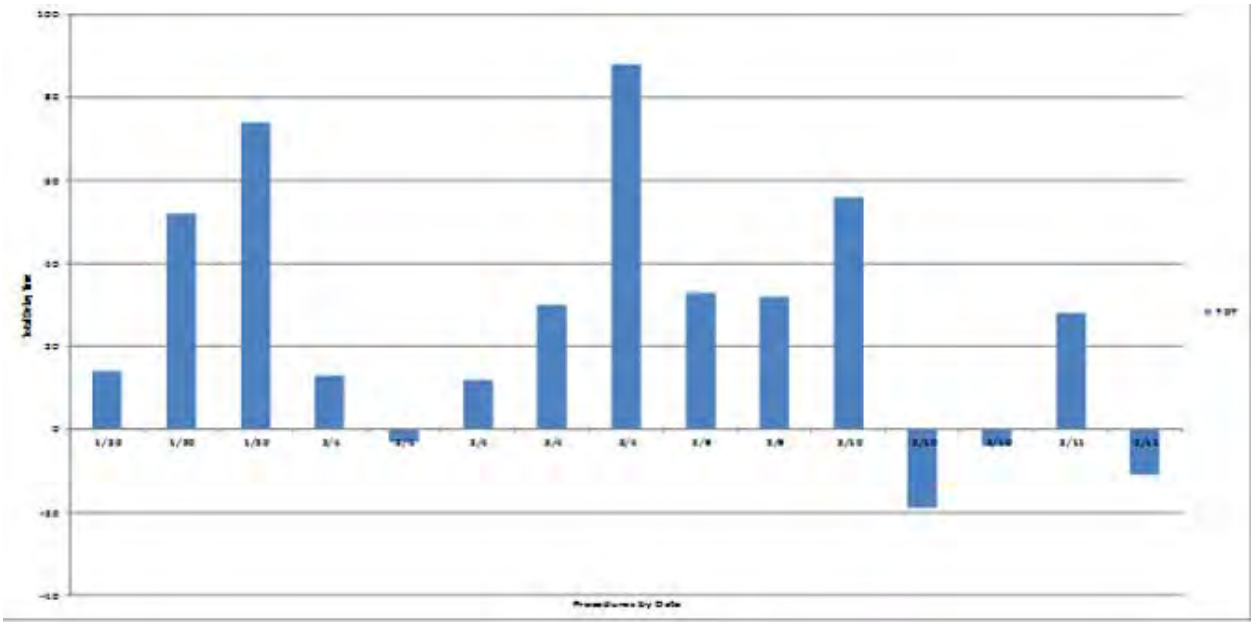


	October 2014	November 2014	December 2014
# of Cases	381	313	396
First Case On time %	70.00%	69.23%	64.29%
Subsequent Case On Time %	36.56%	39.78%	37.06%
All Cases On Time %	40.94%	43.45%	40.91%
All Cases Late %	59.06%	56.55%	59.09%

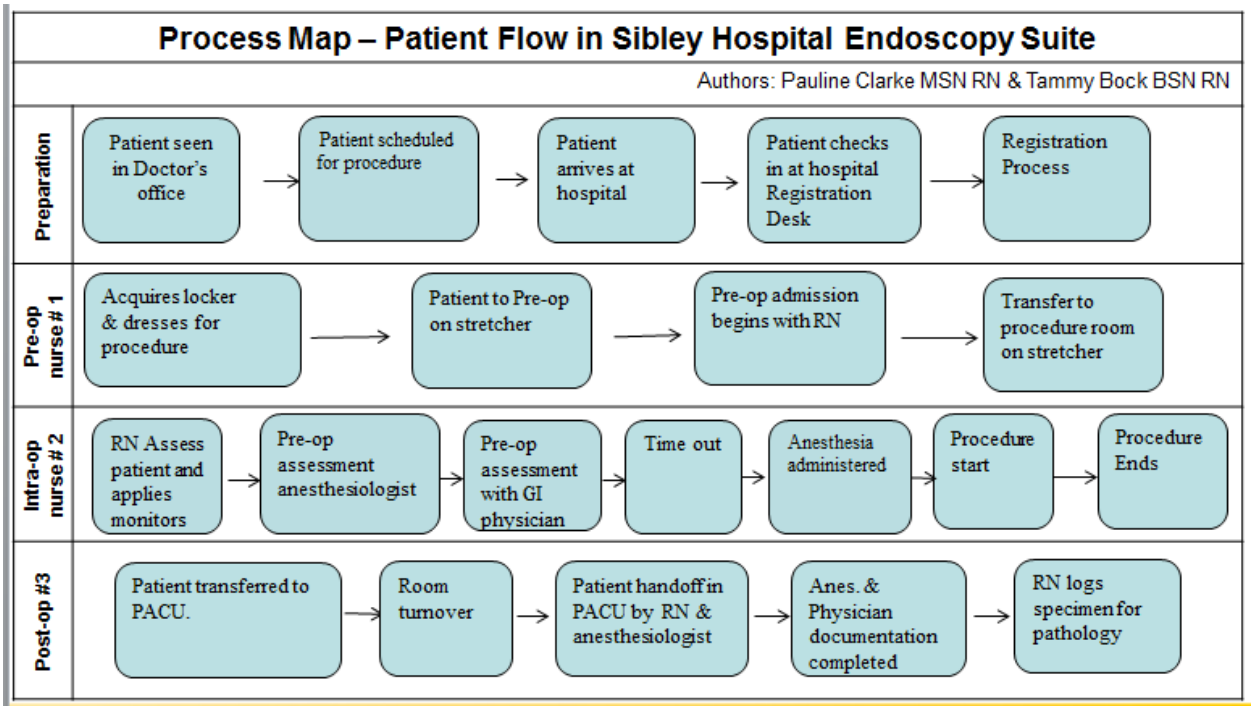
Appendix H – 2 week patient arrival time for Dr. X

2/4	88 minutes	late
2/9	33 minutes	late
2/9	32 minutes	late
2/10	56 minutes	late
2/10	-19 minutes	early
2/10	-4 minutes	early
2/11	28 minutes	late
2/11	11 minutes	late

Appendix I – On time Starts for Dr. X



Appendix J – Process Map



Appendix K – Pilot Process for Dr. X

Pilot Process Steps

1. H & Ps available for anesthesiologists to review 72 hours in advance of scheduled procedure

2. After registration on the day of procedure, all of Dr. X patients placed directly on stretcher for preoperative admission and preparation (this eliminates the process of transferring patients from a chair to the stretcher)

3. Monitor and record all start times

4. Document and report findings to physicians and nursing leadership

5. Strategize a plan for full implementation of process

6. Meeting scheduled with all process stakeholders (administration, physicians, staff, and performance improvement department for next steps

Appendix L – Pilot Results for Dr. X

Date	Posted Time	Regis-tration	In Pre-op	In Pro-cedure Room	Anes-thesia Start	Case Start	Case end	Out of Room	In PACU/ Anes-thesia ends
5-12	8:30	06:34	07:27	08:27	08:22	08:29	08:39	08:43	08:46/ 08:48
5-12	9:15	07:32	08:19	08:57	09:08	09:09	09:25	09:30	09:35/ 09:34
5 -12	10:00	08:37	09:03	09:39	09:49	09:50	09:53	10:00	10:05/ 10:06
5 -12	10:45	08:50	09:22	10:08	10:17	10:22	10:48	10:53	10:59/ 11:01
5-12	11:30	10:14	10:33	11:05	11:14	11:18	11:32	11:38	11:40/ 11:45
5-12	12:15	10:59	11:10	11:47	11:52	11:57	12:11	12:16	12:18/ 12:16
5 -12	13:00	11:58	12:10	12:40	12:50	12:55	13:27	13:35	13:39/ 13:38
5-12	13:45	12:44	13:03	13:42	13:45	13:54	14:29	14:34	1438/not entered

Date	Posted Time	Regis-tration	In Pre-op	In Pro-cedure Room	Anes-thesia Start	Case Start	Case end	Out of Room	In PACU/ Anes-thesia ends
5-13	8am	06:48	07:31	07:55	08:10	08:15	08:29	08:35	08:35/0845
5-13	8:45	08:04	08:15	08:45	08:53	08:59	09:26	09:32	09:32/09:26
5-13	9:30	08:59	09:07	09:44	09:50	09:54	10:08	10:14	10:16/10:17
5 -13	10:15	Case	done in	OR with	different	Staff , MD	using	Travel	Cart
5 -13	11:45	10:45	11:02	12:05	12:10	12:12	12:32	12:39	12:42/12:42
5-13	12:30	10:53	11:14	12:42	12:50	12:53	13:17	13:21	13:21/13:23
5 -13	13:15	12:46	13:04	13:25	13:35	13:38	13:52	13:56	13:56/14:01